REMARKS

Reconsideration and further examination of this applicationis hereby requested. Claims 4-12 are currently pending in the application. Claims 1-3 and 13-25 have been canceled without prejudice to being re-filed in divisional applications.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached pages are captioned "VERSION WITH MARKINGS TO SHOW CHANGES MADE".

A. ELECTION

Applicant hereby elects Species A. Applicant respectfully submits that claims 4-12 are directed to Species A. This election is made without traverse.

Claims 2, 13-18, 20, 23, and 25 are directed to Species B (as illustrated in Fig. 6), and claims 3, 21, and 24 are directed to Species C (as illustrated in Fig. 7), with claims 1, 19, and 22 being sub-generic to both of Species B and C. To advance prosecution of the elected Species A, these claims have been canceled in this application.

B. AMENDMENTS TO THE SPECIFICATION

The written descriptions of Figs. 6 and 7 were inadvertently switched so that the text citing Fig. 6 actually describes what

is shown in Fig. 7, and the text citing Fig. 7 actually describes what is shown in Fig. 6. The present amendment corrects this mistake and harmonizes the written description with the drawings. No new matter has been added.

C. CLOSING

An early examination on the merits is respectfully requested.

The Director of the United States Patent and Trademark Office is authorized to charge any necessary fees, and conversely, deposit any credit balance, to Deposit Account No. 18-1579.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Amend numbered paragraphs 35, 36, and 82-93 as follows:

35. Fig. 6 illustrates a cross sectional view of a single liquid crystal-filled Fabry-Perot etalon according to the third embodiment of the present invention, with an enhanced gap width implemented via a hybrid ~~glass~~ air plus LC gap.

36. Fig. 7 illustrates a cross sectional view of a single liquid crystal-filled Fabry-Perot etalon according to the third embodiment of the present invention, with an enhanced gap width implemented via a hybrid ~~air~~ glass plus LC gap.

82. Referring to **Fig.** ~~**6**~~ 7, a cross sectional view of a single liquid crystal-filled Fabry-Perot etalon according to the third embodiment of the present invention is illustrated, with an enhanced gap width implemented via a hybrid gap of glass and liquid crystal. A first etalon substrate ~~**602**~~ **702** and a second etalon substrate ~~**604**~~ **704** are spaced apart from one another. The etalon substrates ~~**602**~~ **702**, ~~**604**~~ **704** are preferably formed of fused silica. Low phase shift dielectric reflector layers ~~**610**~~ **710**, ~~**608**~~ **708** are coated onto each of respective opposed faces of the etalon substrates ~~**602**~~ **702**, ~~**604**~~ **704**.

83. A spacer plate ~~618~~ 718 is disposed between the first and second etalon substrates ~~602~~ 702, ~~604~~ 704. Precision-dimensioned spacer beads ~~622~~ 722, ~~624~~ 724 define the spacing between the first etalon substrate ~~602~~ 702 and the spacer plate ~~618~~ 718. The spacer plate ~~618~~ 718 is preferably formed of fused silica, as are the spacer beads ~~622~~ 722, ~~624~~ 724.

84. A first transparent conductor layer ~~606~~ 706 is also coated onto the first substrate ~~602~~ 702, and a second transparent conductor layer ~~612~~ 712 is coated onto the face of the spacer plate ~~618~~ 718 facing the first substrate ~~602~~ 702. The transparent conductor layers ~~606~~ 706, ~~612~~ 712 are preferably formed of Indium Tin Oxide (ITO). A preferred proportion of components in the ITO is 4% Tin to 96% Indium Oxide.

85. The top coating layers on the first etalon substrate ~~602~~ 702, and on the spacer plate ~~618~~ 718 are liquid crystal alignment layers ~~614~~ 714, ~~616~~ 716. The alignment layers ~~614~~ 714, ~~616~~ 716 are formed of polyimide (preferably SE7492 polyimide). After coating, the polyimide alignment layers ~~614~~ 714, ~~616~~ 716 are each buffed to provide alignment functionality. A liquid crystal material ~~630~~ 730 is filled in between the first etalon substrate ~~602~~ 702 and the spacer plate ~~618~~ 718. E-44 liquid crystal is preferred.

86. In the implementation illustrated by Fig. ~~6~~ 7, the overall gap between the etalon substrate glass plates ~~602~~ 702, ~~604~~ 704 is augmented by inclusion of the high precision spacer plate ~~618~~ 718. This gap augmentation permits higher spectral resolution measurements than is possible in a cell limited in gap width by the practical limit of liquid crystal (LC) thickness. Without the gap augmentation innovation, the largest gap thickness is approximately 100 microns. When this feature of the present invention is utilized it has been possible to manufacture gaps as large as 10 mm. Furthermore, larger gaps are possible. Fig. 6 illustrates an innovative aspect of the present invention wherein a precision glass spacer plate ~~618~~ 718 is laminated to one of the etalon substrates ~~604~~ 704, preferably using Norland NOA-68 UV adhesive. The reflector ~~608~~ 708 coating remains beneath that lamination. The side of the spacer plate facing the LC includes the Indium Tin Oxide (ITO) layer ~~612~~ 712 followed by a polyamide layer ~~616~~ 716.

87. Referring to **Fig.** ~~7~~ 6, a cross sectional view of a single liquid crystal-filled Fabry-Perot etalon according to the third embodiment of the present invention is illustrated, with an enhanced gap width implemented via a hybrid gap of air and liquid crystal. A first etalon substrate ~~702~~ 602 and a second etalon

substrate ~~704~~ 604 are spaced apart from one another. The etalon substrates ~~702~~ 602, ~~704~~ 604 are preferably formed of fused silica. Low phase shift dielectric reflector layers ~~710~~ 610, ~~708~~ 608 are coated onto each of respective opposed faces of the etalon substrates ~~702~~ 602, ~~704~~ 604.

88. A spacer plate ~~718~~ 618 is disposed between the first and second etalon substrates ~~702~~ 602, ~~704~~ 604. Precision-dimensioned spacer beads ~~722~~ 622, ~~724~~ 624 define the spacing between the first etalon substrate ~~702~~ 602 and the spacer plate ~~718~~ 618. The spacer plate ~~718~~ 618 is preferably formed of fused silica, as are the spacer beads ~~722~~ 622, ~~724~~ 624.

89. Precision spacer posts ~~742~~ 642, ~~744~~ 644 define spacing dimension between the first and second etalon substrates ~~702~~ 602, ~~704~~ 604. The spacer posts ~~742~~ 642, ~~744~~ 644 are preferably formed of fused silica, are matched to 1/4 wavelength in height, and are flat to 1/10 wavelength. The spacer plate ~~718~~ 618 is notched to provide clearance for the spacer posts ~~742~~ 642, ~~744~~ 644.

90. A first transparent conductor layer ~~706~~ 606 is also coated onto the first substrate ~~702~~ 602, and a second transparent conductor layer ~~712~~ 612 is coated onto the face of the spacer plate ~~718~~ 618 facing the first substrate ~~702~~ 602. The

transparent conductor layers ~~706~~ 606, ~~712~~ 612 are preferably formed of Indium Tin Oxide (ITO). A preferred proportion of components in the ITO is 4% Tin to 96% Indium Oxide.

91. The top coating layers on the first etalon substrate ~~702~~ 602, and on the spacer plate ~~718~~ 618 are liquid crystal alignment layers ~~714~~ 614, ~~716~~ 616. The alignment layers ~~714~~ 614, ~~716~~ 616 are formed of polyimide (preferably SE7492 polyimide). After coating, the polyimide alignment layers ~~714~~ 614, ~~716~~ 616 are each buffed to provide alignment functionality.

92. A liquid crystal material ~~730~~ 630 is filled in between the first etalon substrate ~~702~~ 602 and the spacer plate ~~718~~ 618. E-44 liquid crystal is preferred. Thus, the LC cell is bounded by a notched (to accommodate the spacer posts) spacer plate and by one substrate. The spacer-plate and substrate on the other side of the LC are preferably held in place as a cell by epoxy.

93. In the implementation illustrated by Fig. ~~7~~ 6, a method providing particularly large gaps is illustrated. According to this ~~implemantation~~ implementation, precision spacer posts separate the substrates. Rather than laminating the spacer plate to one of the etalon substrates, a large air gap **G** is formed.